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Injury Prevention Practices as Depicted in G- and PG-Rated Movies, 2008–2012

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Abstract

Unintentional injuries are the leading cause of death among children in the United States. The use of recommended safety practices can reduce injuries. Children often learn behaviors from media exposure. Children's movies released in 1995–2007 infrequently depicted appropriate injury prevention practices. The aim of this study was to determine if injury prevention practices in children's movies have improved. The top grossing 25 G-and PG-rated movies in the United States per year for 2008–2012 were eligible for inclusion in the study. Movies or scenes were excluded if they were animated, not set in the present day, fantasy, documentary, or not in English. Injury prevention practices involving riding in a motor vehicle, walking, boating, bicycling, and four other activities were recorded for characters with speaking roles. Fifty-six (45 %) of the 125 movies met the inclusion criteria. A total of 603 person-scenes were examined involving 175 (29 %) children and 428 (71 %) adults. Thirty-eight person-scenes involved crashes or falls, resulting in four injuries and no deaths. Overall, 59 % (353/603) of person-scenes showed appropriate injury prevention practices. This included 313 (70 %) of 445 motor-vehicle passengers who were belted; 15 (30 %) of 50 pedestrians who used a crosswalk, 2 (7 %) of 30 boaters who wore personal flotation devices, and 8 (29 %) of 28 bicyclists who wore helmets. In comparison with previous studies, there were significant increases in usage of seat belts, crosswalks, personal flotation devices, and bicycle helmets. However, 41 % of person-scenes still showed unsafe practices and the consequences of those behaviors were infrequently depicted.

Keywords

Child health; Injury prevention; Media

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Introduction

Unintentional injuries were the leading cause of death for people 1–44 years of age in the United States in 2010 [1]. For persons 1–19 years of age, unintentional injuries accounted for 37 % of all deaths [2, 3]. Many injuries can be prevented by following recommended safety practices such as using a seat belt when in a motor vehicle, a helmet when bicycling, and a personal flotation device (PFD) when boating. Compliance with safety recommendations is often dependent on an individual's behavior which is influenced by multiple factors, one of which is the media. Based on the social cognitive theory, children learn behaviors, in part, through their exposure to media images [4–6]. A recent study found that 8–10 year olds spent 5.5 h a day using various types of media (e.g., television, music, computers) [7]. Popular movies represent a common form of media exposure for children whether viewed in theaters, on television, or over the internet. In three previous studies, appropriate injury prevention practices were infrequently portrayed in movies marketed for children [8–10]. The objective of this study was to determine if the depiction of injury-prevention practices in children's movies has changed during the most recent five-year period.

Methods

The study used the original protocol from the 1995 to 1997 study with minor modifications from the 1998–2002 to 2003–2007 studies (e.g., viewing movies in DVD format instead of VCR) [8].

Sample

For 2008–2012, the 25 G-rated or PG-rated movies were identified each year with the top-grossing domestic box office sales, for a total sample size of 125 movies [11]. On the basis of a national mail-order video company, movies were categorized as action/adventure films, children/family films, comedies, drama, or other. Movies that were animated, not set in the present day (within 10 years of a movie's release), documentary, or not in English were excluded. Fantasy characters were excluded (e.g., space aliens or miniature people). Scenes not set in the present day were excluded because injury-prevention recommendations have changed with time. Scenes depicting fantasy settings (e.g., flying cars or boating in a subterranean lake) or in which safety practices are uncommon in the United States (e.g., seat belt use on a bus or PFD use on a commercial boat) were excluded as well.

Unit of Analysis

Scenes were defined as a portion of a movie where the narrative and action provided a coherent picture with a discrete beginning and end (e.g., a family in a motor vehicle driving to school). A person-scene was defined as a scene where one person was involved in an activity of interest. For example, a person riding in a motor vehicle would be counted as one person-scene. Three people riding in a motor vehicle would be counted as three person-scenes.

Variables Coded

Injury-prevention practices were coded on the basis of recommendations from national organizations (e.g., the American Academy of Pediatrics and/or the Centers for Disease Control and Prevention) [12–20]. For motor vehicle occupants, this included seat belt or child safety seat use. For pedestrians, this included use of crosswalks and looking both ways before entering the street. For boaters, this included use of PFDs. For bicyclists, motorcyclists, rollerbladers, skateboarders, all-terrain vehicle (ATVs) users, snowmobilers, scooter riders, and horseback riders, helmet use was assessed. For skateboarding and rollerblading, use of elbow pads, knee pads, and wrist guards was also assessed.

Coding

Coding was conducted only for characters with speaking roles, which were defined as having at least two lines of dialogue throughout the movie. This was done for two reasons. First, characters with speaking roles were more likely to have an effect on the viewing audience than characters with nonspeaking roles. Second, coding injury-prevention behaviors of all characters in certain scenes would not have been possible (e.g., hundreds of pedestrians crossing a street in a large city). Data were collected on age and gender. Characters were determined to be children or adults on the basis of physical appearance, school attendance, job, and other distinguishing factors. In accordance with the first three studies, characters in scenes where seat belt usage was not clearly visible were treated as unbelted. Scenes with pedestrians already in a street were coded only for use of a crosswalk because it was not possible to determine if the pedestrian looked both ways before entering the street. Finally, injury-prevention practices were not coded for characters that were in life-threatening situations. For example, a hostage forced into a car by a criminal was not assessed for seat belt use. Data were recorded on standardized collection forms by one reviewer who viewed all movies included in the final study sample.

Data Analysis

Data were entered and analyzed in Excel. Relative risks (RRs) and 95 % confidence intervals (CIs) were calculated using EpiInfo 7 (Centers for Disease Control and Prevention, Atlanta, Georgia). Comparisons between previous studies were analyzed by using χ^2 test of trend. Significance testing was restricted to activities with >20 person-scenes in each study; differences were considered significant if the *P* value was <0.05.

Ethics Approval

The Centers for Disease Control and Prevention determined the study was exempt from institutional review board oversight because the study did not involve human subjects.

Results

Fifty-six (45 %) of 125 movies met the inclusion criteria for the study (Table 1). Five (9 %) movies were G-rated and 51 (91 %) were PG-rated (Table 2). Twenty-one (38 %) were children/family films, 18 (32 %) were comedies, 6 (11 %) were action/adventure films, 5 (9 %) were dramas, and 6 (11 %) were other types of movies. The 56 movies included in the study accounted for $4.7 billion in domestic box office receipts. The median box office

gross was $72 million (range $12–$302 million). For the 69 (55 %) movies that were excluded from the study, 50 (40 %) were animated, 10 (8 %) were not set in the present day, 8 (6 %) were documentaries, and 1 (1 %) was a fantasy.

Of the movies meeting the inclusion criteria, a total of 603 person-scenes involved characters with speaking roles participating in activities of interest. These person-scenes involved 175 (29 %) children and 428 (71 %) adults. Thirty-eight (6 %) person-scenes involved crashes or falls, resulting in four injuries and no deaths. Two of the injuries resulted from a motor vehicle crash in which both occupants were properly restrained, one from a skateboarder without a helmet who fell, and one from a boater without a PFD who nearly drowned. Overall, 59 % (353/603) of person-scenes showed appropriate injury prevention practices.

Fifty-one (91 %) movies depicted characters riding in motor vehicles. In 313 (70 %) of 445 person-scenes the characters were appropriately restrained. This included 70 (60 %) of 116 children and 243 (74 %) of 329 adults ($P = 0.009$). Restraint use was more often depicted in G-rated movies [48/56 person-scenes (86 %)] than in PG-rated movies [264/389 person-scenes (68 %)]; ($P = 0.007$). There was no significant difference in use of restraints by gender.

Thirty-seven (55 %) movies depicted pedestrians crossing a street. In 15 (30 %) of 50 person-scenes the pedestrian used a crosswalk. There were no significant differences in use of a crosswalk by age, gender or movie rating. In 10 (34 %) of 29 person-scenes the pedestrian looked both ways before entering the street. Females were more likely to look both ways [8 (62 %) of 13 person-scenes] than males [2 (13 %) of 16 person-scenes]; ($P = 0.016$). There were no significant differences by age or movie rating.

Eleven (20 %) movies depicted biking. In eight (29 %) of 28 person-scenes the characters wore helmets. No significant differences were noted by age, gender or movie rating.

Six (11 %) movies depicted characters boating. In two (7 %) of 30 person-scenes the characters wore a PFD. No significant differences were noted by age or gender; movie rating was not examined because no G-rated movies had boating scenes.

Fifty additional person-scenes involved other recreational activities (e.g., riding a motorcycle, horseback riding, skateboarding, rollerblading). Each of these activities occurred in eight (14 %) movies or less. Helmet use varied from none for horseback riders (0/19 person-scenes) and rollerbladers (0/1) to 27 % for skateboarders (3/11) and 63 % for motorcycle riders (12/19).

Comparison with Previous Studies

When examined across the four study periods (Table 1), there were positive trends in seat belt usage ($P < 0.001$), crossing in a crosswalk ($P < 0.001$), wearing a bicycle helmet ($P = 0.03$) and wearing a PFD ($P < 0.001$). However, only usage of seat belts and bicycle helmets showed continuous improvement in each study period (Fig. 1). No significant change was noted in pedestrians looking both ways before crossing a street.

Discussion

In general, depictions of injury prevention practices in G-and PG-rated movies continued to improve. However, even for seat belt use in motor vehicles which has shown a significant increase from 27 % in the 1995–1997 study to 70 % in the current study, depictions in films lagged behind actual practices [21]. From 2008 to 2012 seat belt use in the United States was reported to have been 83–86 % [22]. Results for bicycle and motorcycle helmet use in movies were somewhat better. The national self-reported rate for always wearing a bicycle helmet in 2008 was 24 % compared to 29 % helmet use in the current study [23]. Motorcycle helmet use from 2008 to 2012 in the United States ranged from 54 to 67 % which was similar to the figure of 63 % from the current study [24]. For PFD use, the national estimate in 2012 was 23 % compared to 7 % in the current sample of movies [25]. National estimates for street crossing behavior were not available to make comparisons with study results. As has been noted previously, the consequences of unsafe behaviors are infrequently shown in movies and television [8–10, 26, 27]. Even when characters crashed or fell, they were rarely injured. These portrayals may cause children to minimize the hazards of risky behaviors [26, 27].

There are two possible explanations for improved depictions of safety practices in children's movies. One is that the films are reflecting social norms. For example, seat belt use in the United States increased from 60 % in 1995 to 86 % in 2012 [22]. However, there appears to be a substantial time lag between safety practices in real life and depictions in movies [21]. The second explanation is that numerous studies have been conducted examining unintentional injuries in movies and television [8–10, 21, 26–29]. The entertainment industry may be responding to efforts by advocacy groups based on those findings.

This study had at least four limitations. First, since the study was restricted to G- and PG-rated films the results may not be applicable to PG13- or R-rated movies which children frequently view or to television which remains the predominant media exposure for children [7, 30]. Second, results are an underestimate of the number of person-scenes viewed by children as data collection was restricted to characters with speaking roles. Many non-speaking characters were shown in activities of interest (e.g., riding in motor vehicles, crossing a street). Third, results may not be representative of all G- and PG-rated movies as only 45 % of eligible films met the inclusion criteria for the study. Films meeting the eligibility criteria have decreased from 67 % (50/75) in the first study to 45 % (56/125) in the current study [8–10]. This is a reflection of an increase in animated films which comprised 12 % (9/75) of films in the 1995–1997 study sample and 40 % (50/125) of films in the 2008–2012 sample. Finally, clustering of person-scenes for a given activity within movies was not controlled for. This potentially could affect results for activities with a small number of person-scenes. However, in reviewing the data clustering of person-scenes was not identified as a problem in the current study.

Depictions of common injury prevention practices continue to improve in movies likely to be viewed by children. However, 41 % of person-scenes still show unsafe practices and the consequences of those behaviors are infrequently depicted. The entertainment industry should improve how injury prevention practices are shown in children's movies. Parents

need to educate their children on appropriate safety practices. This may include discussions of depictions shown in media as well as parental modelling of appropriate behaviors. Health providers caring for children should provide office-based counseling on unintentional injury prevention as well as media exposure [30, 31].

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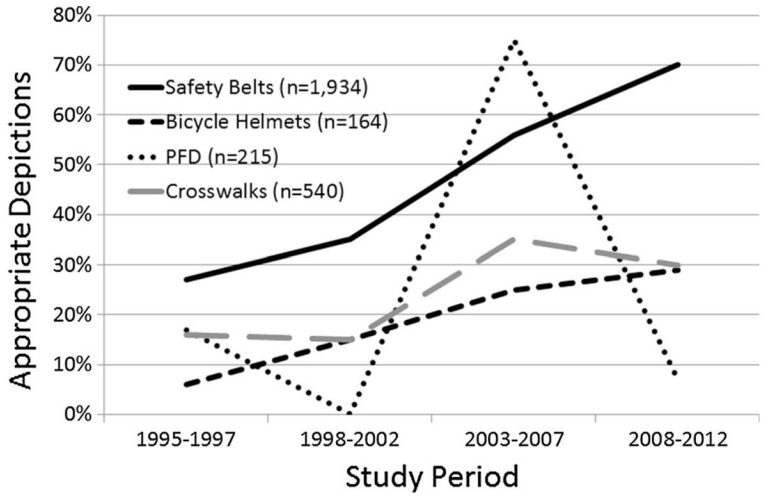

Fig. 1.
Injury prevention practices in G- and PG-rated movies by study period, 1995–2012

Table 1

Activities and safe practices in G- and PG-rated movies, 1995–2012

Activity	Safe practices	1995–1997 (N = 50)		1998–2002 (N = 61)		2003–2007 (N = 67)		2008–2012 (N = 56)	
		Movies n (%)	Safe practices/ person-scenes n (%)	Movies n (%)	Safe practices/ person-scenes n (%)	Movies n (%)	Safe practices/ person-scenes n (%)	Movies n (%)	Safe practices/ person-scenes n (%)
Riding in a motor vehicle	Using the seat belt or a child safety seat	45 (90)	119/447 (27)	57 (93)	172/487 (35)	53 (79)	311/555 (56)	51 (91)	313/445 (70)*
Crossing the street as a pedestrian		32 (64)		39 (64)		37 (55)		21 (38)	
	Using the crosswalk		25/160 (16)		18/119 (15)		73/211 (35)		15/50 (30)*
	Looking both ways		20/109 (18)		19/89 (21)		11/102 (11)		10/29 (34)
Riding a bicycle	Wearing a helmet	15 (30)	4/64 (6)	12 (20)	6/40 (15)	14 (21)	8/32 (25)	11 (20)	8/28 (29)*
Riding in a boat	Wearing a PFD	10 (20)	14/82 (17)	9 (15)	0/23 (0)	9 (13)	60/80 (75)	6 (11)	2/30 (7)*
Riding a motorcycle	Wearing a helmet	3 (6)	3/5 (60)	9 (15)	20/28 (71)	10 (15)	23/41 (56)	8 (14)	12/19 (63)
Horseback riding	Wearing a helmet	3 (6)	2/7 (29)	5 (8)	0/19 (0)	7 (11)	4/20 (20)	5 (9)	0/19 (0)
Skateboarding		3 (6)		4 (7)		4 (6)		8 (14)	
	Wearing a helmet		0/3 (0)		4/8 (50)		5/11 (46)		3/11 (27)
	Wearing elbow pads		0/3 (0)		2/8 (25)		0/11 (0)		2/11 (18)
	Wearing knee pads		0/3 (0)		2/8 (25)		0/11 (0)		2/11 (18)
	Wearing wrist guards		0/3 (0)		0/8 (0)		0/11 (0)		1/11 (9)
Riding a scooter	Wearing a helmet	–	–	4 (7)	11/17 (65)	–	–	–	–
Rollerblading		8 (16)		3 (5)		2 (3)		1 (2)	
	Wearing a helmet		28/42 (67)		1/3 (33)		3/6 (50)		0/1 (0)
	Wearing elbow pads		30/42 (71)		0/3 (0)		3/6 (50)		0/1 (0)
	Wearing knee pads		30/42 (71)		0/3 (0)		3/6 (50)		1/1 (100)
	Wearing wrist guards		31/42 (74)		2/3 (67)		0/6 (0)		0/1 (0)
Riding a snowmobile	Wearing a helmet	1 (2)	1/7 (14)	2 (3)	6/13 (46)	1 (2)	1/1 (100)	–	–
Riding an ATV	Wearing a helmet	–	–	1 (2)	1/2 (50)	1 (2)	1/1 (100)	–	–

*Significant change ($P < 0.05$) from previous studies. Significance testing was restricted to activities with ≥20 person-scenes in each study

Table 2

Ratings and categories of movies, 1995–2012

Ratings and categories	1995–1997 (N = 50) No. of movies (%)	1998–2002 (N = 61) No. of movies (%)	2003–2007 (N = 67) No. of movies (%)	2008–2012 (N = 56) No. of movies (%)
Rating				
G	4 (8)	11 (18)	5 (7)	5 (9)
PG	46 (92)	50 (82)	62 (93)	51 (91)
Category				
Action/adventure	1 (2)	4 (7)	15 (22)	6 (11)
Children/family	20 (40)	13 (21)	13 (19)	21 (38)
Comedy	25 (50)	31 (51)	38 (57)	18 (32)
Drama	3 (6)	6 (10)	1 (2)	5 (9)
Other	1 (2)	7 (11)	0 (0)	6 (11)